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ATTACHMENT 25

Superfund Record of Decision:
Waverly Ground Water Contam., NE
(EPA/ROD/R07-90/039)
September 1990



Superfund Record of Decision:

Waverly Ground Water Contamination, NE

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REPORT DOCUMENTATION PAGE		1. REPORT NO. EPA/ROD/R07-90/039	2.	3. Recipient's Accession No.
4. Title and Subtitle SUPERFUND RECORD OF DECISION Waverly Ground Water Contamination, NE First Remedial Action - Final			5. Report Date 09/26/90	
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			13. Type of Report & Period Covered 800/000	
15. Supplementary Notes			14.	
16. Abstract (Limit: 200 words)				
<p>The Waverly Ground Water Contamination site is in Waverly, Lancaster County, Nebraska. At this municipally owned site, the ground water aquifer provides 100 percent of the drinking water for the community of approximately 2,000 people through the municipal water system. Between 1952 and 1974, a Federal grain facility, located on a portion of the site, was the source of ground water contamination. From 1955 to 1965, the fumigant 80/20, composed of 80 percent carbon tetrachloride and 20 percent carbon disulfide, was used onsite on stored grain. Chloroform is a by-product of carbon tetrachloride production and may also have been present onsite. In 1982, contamination was detected in Public Water Supply Well (PWS) Numbers 1 and 3. PWS 3 was removed from service and four additional wells were installed outside the known area of contamination. In 1988, EPA began contaminant treatment at the site by installing an air stripping system, in conjunction with ground water pumping and treatment and soil vapor extraction systems. The contaminants of concern affecting the soil and ground water are VOCs including carbon tetrachloride and chloroform.</p> <p>The selected remedial action for this site includes continued operation and maintenance of the ground water air stripping system and the soil vapor extraction system; ground (See Attached Page)</p>				
17. Document Analysis a. Descriptors				
Record of Decision - Waverly Ground Water Contamination, NE First Remedial Action - Final Contaminated Media: soil, gw Key Contaminants: VOCs				
b. Identifiers/Open-Ended Terms				
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EPA/ROD/R07-90/039

Waverly Ground Water Contamination, NE
First Remedial Action - Final

Abstract (continued)

water monitoring to delineate the magnitude and extent of contamination; evaluation of the construction of PWS 3 to explain the contamination in this well; sampling existing and new monitoring wells; development of a ground water flow and transport model to determine the correct pumping rate for the existing ground water extraction well, and investigation of the potential uses for the treated water discharged offsite. The estimated present worth cost for this remedial action is \$3,550,000, which includes an annual O&M cost of \$451,000 for 15 years.

PERFORMANCE STANDARDS OR GOALS: Soil gas cleanup levels for VOCs will be reduced to the performance criteria level of 6.5 ug/kg calculated for the site. Soil levels were below the calculated cleanup levels of 1.1 mg/kg and 1.7 mg/kg for carbon tetrachloride and chloroform, respectively. The treated water discharge will meet State NPDES permit levels of 5.0 ug/l for carbon tetrachloride and 3.8 mg/l for chloroform. Ground water cleanup levels will meet State MCLs including carbon tetrachloride 5.0 ug/l (MCL) and chloroform below 3.8 ug/l (MCL).

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DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Waverly Ground Water Contamination Site
Waverly, Nebraska

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selected remedial action for the Waverly Ground Water Contamination Site in Waverly, Nebraska, chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based upon the contents of the Administrative Record for the Waverly Ground Water Contamination Site.

The United States Environmental Protection Agency and the State of Nebraska agree on the selected remedy. The State of Nebraska concurs with this Record of Decision.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

This final remedy addresses the principal threat through the remediation of ground water and soil contamination by eliminating or reducing the risks posed by the Site through treatment.

The major components of the selected remedy include:

- Extraction of the contaminated ground water using the existing ground water extraction well;
- Onsite treatment of the extracted ground water using existing air strippers;
- Active soil gas extraction using existing system of soil vapor extraction wells; and,

RECORD OF DECISION
DECLARATION
WAVERLY GROUND WATER CONTAMINATION SITE
WAVERLY, NEBRASKA

Prepared by:
THE ENVIRONMENTAL PROTECTION AGENCY
REGION VII
KANSAS CITY, KANSAS
September 1990


- Continued investigation of the contaminant plume and monitoring of the systems to determine the effectiveness of the remedy.

These response actions would prevent future ingestion of hazardous substances by containing the contaminated ground water plume, removing the contamination, and restoring the aquifer to acceptable goals for unrestricted use.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

A review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.



Morris Kay
Regional Administrator
U.S. Environmental Protection Agency
Region VII



Date



STATE OF NEBRASKA

DEPARTMENT OF ENVIRONMENTAL CONTROL

KAY A. ORR
GOVERNOR

DENNIS GRAMS
DIRECTOR

September 14, 1990

Mr. Morris Kay
Regional Administrator
EPA Region VII
726 Minnesota Avenue
Kansas City, KS. 66101

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SEP 24 1990

REGIONAL ADMINISTRATOR

Dear Mr. Kay:

Upon consideration of the Administrative Record and the draft Record of Decision (ROD), the Nebraska Department of Environmental Control (NDEC) concurs with the Environmental Protection Agency's remedy selection for the Waverly Ground Water Contamination Site.

NDEC understands that the remedy will remediate the contaminated ground water through ground water extraction and treatment and the unsaturated zone through active soil vapor extraction. In addition, NDEC understands that additional investigation will be performed to ensure that remediation of all contaminated areas above the action levels, defined in the draft Record of Decision, will be achieved.

The selected remedy presented in the draft ROD will meet all state requirements.

NDEC appreciates the opportunity for involvement in the remedy selection process.

Sincerely,

Dennis Grams, P.E.

IV/rm

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~~REMD SECTION~~
REML

RECORD OF DECISION
WAVERLY GROUND WATER CONTAMINATION SITE
WAVERLY, NEBRASKA

Prepared by:
THE ENVIRONMENTAL PROTECTION AGENCY
REGION VII
KANSAS CITY, KANSAS
September 1990

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FIGURE 1

FIGURE 1 (continued)

TABLE 1

TABLE 2

SECTION I. SITE NAME, LOCATION, AND DESCRIPTION

The Waverly Ground Water Contamination Site is located in Lancaster County in southeastern Nebraska in and near the City of Waverly. Waverly is located (Figure 1) along State Highway 6, approximately 10 miles northeast of Lincoln, Nebraska. The Site is in the northwest portion of Waverly. A former Commodity Credit Corporation Federal grain facility was located on a portion of the Site. This facility was located along the south side of Oldfield Street just west of North 141st Street.

The population of the City of Waverly is approximately 2,000. The land immediately north of the Site is primarily used for agriculture, and the land use immediately to the south of the Site is residential. The City of Waverly obtains 100 percent of its drinking water supply from the municipal water system which taps the ground water aquifer.

Analytical results from water samples taken from local public and private drinking water wells in June 1984 showed concentrations of carbon tetrachloride as high as 3,120 micrograms per liter, and chloroform concentrations as high as 37 micrograms per liter. The former Federal grain facility has been identified as the source of contamination based upon evaluation of ground water data, soil gas analysis, and past grain fumigation practices. A grain fumigant, named 80/20, was used at the facility. The 80/20 fumigant was composed of 80 percent carbon tetrachloride and 20 percent carbon disulfide.

The Environmental Protection Agency conducted an expedited response action to control the source and spread of contamination at the Site. A ground water extraction and air stripping system, which removes contaminants from the aquifer and helps to contain the spread of the contaminated ground water plume, removes and treats the contaminated ground water. An active soil gas extraction system removes the contaminants from the soils and acts to control the transfer of contaminants from Site soils above the water table to the ground water. The systems went into operation in February 1988 and have been operating effectively since then. As of March 1990, the highest concentrations of carbon tetrachloride and chloroform at any of the monitoring points at the Site were 165 micrograms per liter and 6.5 micrograms per liter, respectively, in the influent water to the system from the ground water extraction well. The combined air emission rate from the air stripping and vapor extraction systems has dropped from initial values of 0.051 grams per second to the March 1990 value of 0.0011 grams per second. The emission rates include both carbon tetrachloride and chloroform.

Surface runoff from the Site enters local ditches and flows west to Salt Creek. The Site is underlain by about 13 feet of loess, which is over 80 feet of sand in two layers separated by

approximately five feet of clay with limestone bedrock occurring at a depth of about 100 feet. The depth to ground water in the area of the Site is between 10 and 20 feet. The major surficial aquifer in the Site area is the Waverly aquifer, and five of the City of Waverly's supply wells are developed in this aquifer. The direction of ground water flow in the Waverly aquifer is to the north-northwest with an estimated flow velocity of 90 to 150 feet per year.

SECTION II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Commodity Credit Corporation, a part of the U. S. Department of Agriculture, operated a Federal grain facility at the Site between 1952 and 1974. The facility consisted of grain storage structures (approximately 100 bins and 13 quonset huts) on concrete foundations. The fumigant 80/20 was used at the facility between approximately 1955 and 1965. The fumigant is reported to have been composed of 80 percent carbon tetrachloride and 20 percent carbon disulfide. Chloroform also may have been present in 80/20 as a by-product of the production of carbon tetrachloride.

Since 1975, the former Federal grain facility property has been owned by Lancaster County which operates a district office and maintenance facility on the premises. Parts of the Site are covered by piles of road maintenance and construction materials and graveled parking areas. Some of the original grain storage foundations still exist at the Site.

The Environmental Protection Agency sampled the Waverly municipal water system in July 1982 as part of a nationwide survey. The analytical results indicated contamination of Public Water Supply Well Numbers 1 and 3 with carbon tetrachloride and chloroform at concentrations of up to 200 micrograms per liter and 7.5 micrograms per liter, respectively. Subsequent sampling of Well Number 3 in 1983, 1984, 1985 and 1986 has shown high levels of carbon tetrachloride and chloroform. The Site was placed on the National Priorities List of sites requiring long-term remedial action in October 1984.

Subsequent to the discovery of contamination, Public Water Supply Well Numbers 1 and 2 were relegated to "standby" status, and Well Number 3 was removed from service. Between 1982 and 1987, four additional Public Water Supply Wells were installed south of the Site. Two of these wells are two miles southwest of town, which is outside the study area for the Site and outside the known extent of the contaminant plume associated with the Site.

In 1985, forty-seven wells near the Site were sampled for a wide range of parameters including volatile organics, semi-volatile organic compounds, metals, and pesticides as part of the

characterization of the Site. Analysis of samples from Public Water Supply Well Number 3 again showed significant contamination. The contaminants that were found in this well at significant concentrations were carbon tetrachloride and chloroform. Iron, manganese, and selenium were found to exceed National Drinking Water Standards in some of the ground water samples taken during the 1985 study. The iron and manganese standards are considered secondary drinking water standards and are intended to provide guidelines on aesthetic qualities such as taste, odor, or color. The selenium standard is considered to be a primary drinking water standard and is set to protect public health. These contaminants have not been detected at concentrations above the standards in the public water supply or private wells sampled to monitor the response action systems at the Site, and they are not considered contaminants of concern for the Site.

In May 1986, the Environmental Protection Agency developed an Engineering Evaluation Cost Analysis Report outlining an expedited response action. The response action outlined included pump and treat using air stripping technology and soil gas extraction. Design of the systems was completed in May 1987, and a public meeting was held in Waverly with the Mayor and City Council to receive their comments on the response action systems.

The Environmental Protection Agency began operation of the current expedited response action systems at the Site in February 1988. A Compliance Agreement between the Commodity Credit Corporation of the U. S. Department of Agriculture and the Environmental Protection Agency went into effect in May 1988. In June 1988 the Commodity Credit Corporation took over the operation and maintenance of the response action. The Commodity Credit Corporation of the Department of Agriculture is the only potential responsible party for the Site and will implement the actions described in this Record of Decision.

SECTION III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Feasibility Study and Proposed Plan for the Waverly Ground Water Contamination Site were released to the public in July 1990. The Administrative Record file, which includes these documents, was made available to the public at information repositories maintained at the Waverly City Hall, in Waverly, Nebraska, and the Environmental Protection Agency Docket Room, in Kansas City, Kansas. Notice of the availability of these documents for review and comment was published in The Waverly News and The Lincoln Journal on August 9, 1990. The public comment period ended September 7, 1990. In addition, a public meeting was held in Waverly on August 20, 1990 to present the results of the Feasibility Study and the preferred alternative as presented

in the Proposed Plan for the Site. All comments received by the Environmental Protection Agency prior to the end of the public comment period, including those expressed verbally at the public meeting, are addressed in the Responsiveness Summary.

SECTION IV. SUMMARY OF SITE CHARACTERISTICS

Carbon tetrachloride and chloroform contamination have been found on and off the Waverly Site. Onsite, the contamination was found in the soil, soil gas, and ground water. Offsite, carbon tetrachloride and chloroform were found in ground water. The contamination of the Waverly aquifer as described below is the principal threat associated with this Site. The Waverly aquifer is a source of drinking water for the City of Waverly.

Soil contamination occurs primarily in the north central portion of the Site. The maximum concentrations of carbon tetrachloride and chloroform were 400 micrograms per kilogram and 44 micrograms per kilogram, respectively. Soil gas contamination was measured in all the vapor extraction system wells tested. The maximum concentrations of carbon tetrachloride and chloroform were 5,926 parts per million and 1,800 parts per million, respectively. Ground water contamination onsite was found in all four shallow wells screened at the top of the aquifer (13 to 28 feet). Maximum concentrations of carbon tetrachloride and chloroform at levels of 940 micrograms per liter and 140 micrograms per liter, respectively, were found in Monitoring Well Number 1A, located on the northern edge of the Site. Contamination was not found in the deeper wells onsite (50 to 80 feet).

Ground water contamination was also found to the north of the Site in monitoring well Number 5B, the Hedrick South Well, and Public Water Supply Well Number 3. Maximum concentrations of carbon tetrachloride and chloroform in Monitoring Well Number 5B were 260 micrograms per liter and 20 micrograms per liter, respectively. Monitoring Well Number 5B is screened from a depth of 45 to 50 feet. Carbon tetrachloride concentrations in the Hedrick south and Public Water Supply Well Number 3 were 14 micrograms per liter and 9 micrograms per liter, respectively; however, the depths of the screened intervals are not known in these wells. No volatile contaminants were detected in any of the upgradient wells located south of the Site. This ground water characterization is based on September 1987 data.

Contamination occurs near the top of the aquifer onsite and in the lower part of the upper portion of the Waverly aquifer to the north of the Site. The areal extent of the ground water contamination in the vicinity of the Site cannot be defined on the basis of the existing monitoring well network. Additional clustered monitoring wells should be installed north and northwest of the Site to determine the extent of the plume in these directions.

The ground water extraction and air stripping system and the soil gas vapor extraction systems have now operated for more than two years. January 1990 data indicated that the only wells still showing contamination are Monitoring Well Number 2A onsite and the Hedrick south well offsite with concentrations of carbon tetrachloride at 9 micrograms per liter and 24 micrograms per liter and chloroform concentrations at 7 micrograms per liter and 9 micrograms per liter, respectively. Public Water Supply Well Number 3 did not contain detectable levels of either compound.

SECTION V. SCOPE OF RESPONSE ACTION

The principal threat at the Site is the carbon tetrachloride and chloroform contamination in the Waverly aquifer which is used by the City of Waverly as a source of drinking water. The selected response actions will address the principal threat through the remediation of contaminated ground water as well as the remediation of contaminated soils. Uncontaminated drinking water is being provided to the City of Waverly through the municipal wells currently in operation. Past and ongoing actions taken at the Site are also contributing to the protection of the City's water supply and the cleanup of the Site by removing contaminants from the soil and ground water, preventing the migration of the plume of contamination in the ground water to the current drinking water supply wells, and taking the contaminated City wells out of service. However, if the plume of contaminated ground water was allowed to migrate to the current supply wells or the supply wells now out of service or on standby were activated, a threat of exposure to contaminated ground water would exist. To address the potential risks from such exposure, the following remedial action objectives were identified:

- * Prevent potential exposure to contaminated ground water;
- * Protect uncontaminated ground water for future use by preventing further migration of the contaminated ground water plume; and,
- * Restore contaminated ground water for future use as drinking water by reducing the carbon tetrachloride and chloroform concentrations below health based criteria.

SECTION VI. DESCRIPTION OF THE INTERIM REMEDY

In February 1988, the Environmental Protection Agency began operating expedited response action systems at the Waverly Ground Water Contamination Site. The air stripping system, in conjunction with the ground water extraction system, was designed to provide an effective method for remediating ground water contami-

nation. The vapor extraction system was designed to provide a method of source control that would remove contamination located in the soils between the ground surface and the water table and remove contamination volatilizing off the ground water table.

The air stripping system is designed to accept a flow rate of 400 gallons per minute from the ground water extraction well containing concentrations of carbon tetrachloride and chloroform of up to 4,000 micrograms per liter and 360 micrograms per liter, respectively, and to remove 99.9 percent of the contaminant concentration. Water is pumped to a flow distributor at the top of the stripper and cascades down through a bed of inert packing material. Clean air enters the bottom of the column and is driven upward through the packing exiting at the top of the column. The volatile contaminants are transferred from the water to the air resulting in treated water with very low volatile concentrations and air with elevated levels of volatiles. The air and volatile contaminants exit the system through a stack which is 41 feet above grade, and the emissions from the stack should not exceed the performance standard of 0.147 grams per second. The treated effluent water from the air stripper is discharged to the ditch north of the Site. The effluent water flows west via drainage ditches to Salt Creek. The maximum permitted contaminant concentrations in the discharge water are regulated by the National Pollutant Discharge Elimination System (NPDES) as set by the Nebraska Department of Environmental Control (NDEC). The effluent standards are 6.95 micrograms per liter and 5.0 micrograms per liter for carbon tetrachloride and chloroform, respectively. The discharge water is sampled monthly, as required by the permit.

The ground water extraction well was installed on the north edge of the Site in the area of greatest ground water contamination. The well is screened in two intervals: 19 to 34 feet, and 39 to 49 feet below the ground surface. The well is designed to have a zone of influence between 1,000 and 1,400 feet when pumping at 150 gallons per minute. Public Supply Well Number 3 and the Hedrick south well are approximately 900 and 1,200 feet from the ground water extraction well, respectively. Carbon tetrachloride concentrations in Public Water Supply Well Number 3 have declined from 9 micrograms per liter in October 1987 to below detection limits currently. The Hedrick well is still contaminated with carbon tetrachloride concentrations ranging from 20 to 50 micrograms per liter. However, the Hedrick south well is an open hand-dug well in the basement of the residence and its validity as a monitoring point is questionable. The installation and sampling of monitoring wells in the area near the Hedrick south property to address this uncertainty will be done as part of this remedial action. As of January 1990 the only monitoring well still showing detectable concentrations of contaminants is monitoring well number 2A which is a shallow well onsite.

The vapor extraction system consists of 17 vapor extraction wells installed in the soil above the water table at depths between 27 and 29 feet with the lower 15 to 20 feet screened. A blower, sized for 160 cubic feet per minute air flow rate, creates a vacuum in the vapor extraction wells. Air is drawn through the soil which induces the transfer of easily volatilized compounds from solution to the vapor phase. The vapors are then drawn into the vapor extraction wells and exit the system at the top of the air stripping towers (41 feet above grade).

In tests, the radius of influence for a vapor extraction well is about 100 feet. The combined contaminant emissions from the vapor extraction system and the air stripping system should not exceed the 0.147 grams per second performance standard.

Performance criteria have been established for combined volatile organic compound air emissions, ground water, surface water, soil, and soil gas at the Site to protect human health and the environment. The criteria include the compliance points, action levels, monitoring frequency, and compliance period for each media. The performance criteria are summarized in Tables 1 and 2. These performance criteria have been incorporated in the Compliance Agreement between the Environmental Protection Agency and the Commodity Credit Corporation of the U. S. Department of Agriculture and will be incorporated in any future agreements between these agencies.

SECTION VII. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

In making decisions on site remedies, the Environmental Protection Agency identifies the requirements of regulations, statutes criteria and standards which would be applicable to the remedial action taken at a site or if not applicable, then relevant and appropriate to the actions taken at a site. The applicable or relevant and appropriate requirements for the Waverly Site are as follows:

1. The Safe Drinking Water Act (40 U.S.C. §300) National Primary Drinking Water Standards (40 C.F.R. Part 141) establishes health-based standards for public water systems by establishing Maximum Contaminant Levels (MCLs). The MCL for carbon tetrachloride is five micrograms per liter in drinking water, and the MCL for chloroform is 100 micrograms per liter for the sum of the concentrations of a set of trihalomethane compounds which include chloroform;
2. The Clean Water Act (33 U.S.C. §1251 et seq.) Water Quality Criteria (40 C.F.R. Section 131) sets criteria for water quality based on toxicity to aquatic organisms and human health;

3. The Clean Air Act (42 U.S.C. §7401 et seq.) establishes air emission requirements;
4. State of Nebraska Ground Water Quality Standards and Use Classification (Title 118) establishes standards for ground water and includes an antidegradation provision;
5. State of Nebraska Air Pollution Control Rules and Regulations (Title 129) establishes emission rates for which sources must obtain construction permits and report emissions annually. The applicable or relevant and appropriate emission rates are as follows:
 - (a) 15 or more pounds of volatile organic compounds in any hour of operation of 100 or more pounds of volatile organic compounds in any consecutive 24-hour period (Chapter 4 004.01E); and,
 - (b) 2.5 tons/year or more of any toxic air pollutant (Chapter 4 004.01G). Toxic air pollutants are listed in Appendix III of Title 129.
6. The Occupational Safety and Health Act (29 U.S.C. §651 et seq.) regulates worker health and safety;
7. The State of Nebraska Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System (Title 119) establishes permitting, monitoring, and reporting requirements for discharges from point sources; and,
8. Nebraska Department of Health Regulations Governing Public Water Supply Systems (Title 179, Chapter 2) lists drinking water standards and requirements for permitting, operating, monitoring, and reporting for public water supply systems.

SECTION VIII. SUMMARY OF SITE RISKS

The risk evaluation contained in the Site Characterization Report (February 1988) assessed the potential hazards to public health that may result from the release of hazardous substances or contact with hazardous substances found at the Site. The risk assessment consisted of the evaluation of the potential health effects and environmental fate of the contaminants of concern found at the Site. These contaminants have been identified as carbon tetrachloride and chloroform. The risk assessment considered carcinogenic potential and daily exposure based on maximum concentrations detected to estimate incremental lifetime cancer risks.

The contaminants of concern, carbon tetrachloride and chloroform, have been classified by EPA as "B2" or probable human

carcinogens. The B2 classification includes hazardous substances for which there is sufficient evidence of increased incidence of cancer from animal studies and inadequate evidence or no data from human epidemiologic studies. The level of risk is expressed in scientific notation, e.g., 1×10^{-6} , and represents the probability or range of probabilities of developing additional incidence of cancer under the prescribed exposure conditions. For example, an excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper bound, the risk of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions is one in one million. Cumulative risk levels of 1×10^{-6} to 1×10^{-4} can be used to determine the "environmental significance" of the risk incurred and are used as a target range when evaluating remedial actions at a site or the need for remedial actions at a site. A cumulative risk greater than 1×10^{-4} is considered to be unacceptable. Risks between 1×10^{-6} and 1×10^{-4} are considered to be potentially unacceptable, and risks less than 1×10^{-6} are considered to be insignificant. These classifications are not absolute and are considered only to put site risks into perspective.

The exposure pathways considered in the risk evaluation were: worker and resident exposure to soil through ingestion and direct contact; exposure to contaminated ground water through ingestion; and, exposure to air emissions generated by the air stripping and vapor extraction systems through inhalation. Since the likelihood of human exposure to significant levels of carbon tetrachloride and chloroform contained within the soil gas at the Site is remote, this route was not considered.

1. SOIL

The incremental lifetime cancer risk for onsite workers through ingestion and direct contact with Site soils contaminated with carbon tetrachloride and chloroform is 0.57×10^{-7} . This number is based on 20 years of five-day weeks during the outdoor work season and maximum soil concentrations for carbon tetrachloride and chloroform similar to those at the Site.

The incremental lifetime cancer risk for onsite residents through ingestion and direct contact with Site soils contaminated with carbon tetrachloride and chloroform is 4.86×10^{-7} . This number is based on 70 years of seven-day weeks and maximum soil concentrations of 0.40 milligrams per kilogram and 0.051 milligrams per kilogram of carbon tetrachloride and chloroform, respectively.

Both of the above cancer risk levels are less than the one in one million (1×10^{-6}) additional cancer risk and would, therefore, be classified as insignificant.

2. GROUND WATER

The excess lifetime cancer risk associated with the ingestion by a 70 kilogram adult of two liters of water on a daily basis over a lifetime of 70 years from Public Water Supply Well Number 3 (the most highly contaminated public well at the Site -- now out of service) is 1.2×10^{-2} . This number is the sum of the risks from the ingestion of carbon tetrachloride and chloroform. The risk for each compound is the product of the intake level that is based on the highest concentration found in Public Water Supply Well Number 3, which is 3,120 micrograms per liter and 810 micrograms per liter for carbon tetrachloride and chloroform respectively, and carcinogenic potency factors which are 0.13 and 0.0061 respectively. This risk estimate indicates that, as a plausible upper bound, 12 additional cancers may occur in a population of 1,000; which exceeds the risk range that EPA considers protective of human health.

3. AIR

The risks associated with the air emissions generated through the air stripping and vapor extraction systems have been evaluated. Using a unit risk factor of 1.5×10^{-5} cubic meters per microgram for carbon tetrachloride, the acceptable ambient air concentration in micrograms per cubic meter for an individual lifetime cancer risk of 1×10^{-6} can be calculated using the equation below:

$$\text{Acceptable Ambient Air Concentration} = (\text{Individual Risk}) / (\text{Unit Risk Factor})$$

For a 1×10^{-6} individual lifetime cancer risk, the acceptable ambient air concentration value for carbon tetrachloride is 0.066 micrograms per cubic meter. For a 1×10^{-4} individual lifetime cancer risk, the acceptable ambient air concentration value for carbon tetrachloride is 6.6 micrograms per cubic meter.

Ambient air monitoring was conducted shortly after the air stripping and vapor extraction system went into operation (Spring and Summer of 1988). The results of this sampling indicated that at two stations, the 6.6 microgram per cubic meter concentration was exceeded based on a 95 percent confidence level over the six sampling events in the survey. All of the concentrations that exceeded the 1×10^{-4} cancer risk were taken during the first sampling event when the emissions for the systems were at their highest levels. The air monitoring survey also indicated that additional air monitoring will not be necessary since the emissions from the system will decrease over time. Calculations based on contaminant concentrations in the soil gas and ground water extracted from the Site show that air emissions rates for the response systems have decreased significantly over time. The

results of these calculations can be found in the quarterly reports from the Commodity Credit Corporation under total air emissions for the systems.

SECTION IX. DESCRIPTION OF THE ALTERNATIVES

The Expedited Response Actions were taken at the Site to prevent the further spread of contamination to the wells that the City of Waverly currently uses for its drinking water and to remove contamination from the soil and ground water until a final remedial action could be initiated. The analysis and supporting data for the selection of the response action systems at the Site are documented in the Engineering Evaluation Cost Analysis Report (May 1986). It is a requirement of the Expedited Response process that the interim remedy be compatible with the final remedial action for the Site.

Three alternatives for final remedial action were evaluated in the Feasibility Study using the nine criteria as outlined in the National Contingency Plan of: technical and administrative feasibility, capital costs, operation and maintenance costs, environmental impacts, protection of public health and the environment, compliance with applicable or relevant and appropriate Federal and State regulations and statutes, and community and State acceptance.

Alternative 1. No Further Action

Under this alternative, no further remedial actions would be required at the Site. The No Further Action alternative serves as a basis of comparison for the other remedial alternatives. This alternative is evaluated to determine the risks that would be posed to public health and the environment if no action were taken to treat or contain the contamination at the Site.

This alternative would result in the shutdown of the ground water extraction and air stripping system, and the soil vapor extraction system and no further investigation of the Site. A recommendation would be made to the City and or State to monitor the water system to help prevent the consumption of contaminated water when concentrations of VOCs exceed action levels. Applicable or relevant and appropriate requirements would not be met and risks to the public would increase.

Alternative 2. Continue Use of Present Systems and Install Additional Ground Water Extraction Well with Treatment and Discharge of Extracted Water

Under this alternative, an additional ground water extraction well (GWEX) would be developed to supplement the existing ground water extraction wells. The purpose of the increased extraction rate or extraction location would be to

capture ground water contaminated above the action levels (Tables 1 and 2) set for the Site which is outside the influence of the existing extraction well. Such a system could also reduce the time required to clean up the aquifer system thus potentially providing significant cost savings. Contaminated ground water extracted from the new extraction point would require treatment and discharge systems that meet the current criteria (Tables 1 and 2) set for the Site.

This alternative could be accomplished using an existing well, e.g., Public Water Supply Well Number 3, as an extraction point or siting of a new extraction well. The current air stripping system has unused treatment capacity which could handle the additional extracted water stream, or an additional treatment system may need to be designed. The capacity of the current discharge path would need to be examined and additional capacity provided if necessary. It is possible that air monitoring would be required to determine if any increase in air emissions released by the system presents any additional health risk to residents or workers in the area of the Site. However, before the need for a new extraction well could be evaluated, it would be necessary to determine the full extent of contamination at the Site and the effectiveness of the current extraction system.

Alternative 3. Continue Operation of the Expedited Response Action Systems and Verify the Effectiveness of the Systems

Under this alternative, the current expedited response action systems would continue to be operated, maintained and monitored. In addition, the necessary investigations would be performed to determine the extent of Site contamination and the effectiveness of the current systems to remediate the discovered contamination.

The investigative steps would be as follows:

1. Monitoring well clusters (nested wells) are required to the north and northwest to delineate the magnitude and extent of contamination along this potential migration route. A survey of existing wells north, northeast, and northwest of the Site (downgradient) should be performed. Data should be obtained from the identified wells and used in siting the new monitoring well clusters. The new and existing wells should be sampled for VOCs, and a phased approach to the installation of the monitoring wells is warranted.
2. A pumping and recovery aquifer test should be conducted, utilizing the existing ground water extraction well and monitoring wells to evaluate the hydraulic properties of the aquifer. The extraction well should be pumped at a constant rate for a minimum of 72 hours followed by a 72-hour recovery

test. Results of this test would allow an evaluation of the performance of the ground water extraction well and determine the radius of influence or capture zone resulting from pumping at a constant rate. Additionally, the hydraulic parameters obtained from the aquifer test will allow for analytical and/or numerical modeling of aquifer flow and contaminant transport to predict migration and cleanup of the contaminant plume.

3. The well construction details of Public Water Supply Well Number 3 (PWS Number 3) should be documented or determined by geophysical logging. This will more fully explain the presence of contamination in this well and the occurrence of clay layers within the aquifer system and whether the upper and lower parts of the shallow aquifer are connected. This information can be used to determine if PWS Number 3 could be used as an additional ground water extraction well if necessary. If PWS 3 is not a good candidate for an additional extraction well or if the investigation demonstrates that additional extraction wells are not necessary, Public Water Supply Well (PWS) Number 3 may require plugging to prevent cross contamination of the aquifers. If PWS Number 3 does not provide a route for cross contamination of the upper and lower parts of the aquifer system, it can be returned to service after the cleanup is complete.
4. Sampling of the existing and new monitoring wells, PWS wells, domestic wells, vapor extraction wells, soil gas monitoring wells, air compliance points, and the Ground Water Extraction Well (GWEX) should continue as specified in the Performance Criteria in Tables 1 and 2.
5. Develop a ground water flow and transport model of sufficient detail to determine the correct pumping rate for the existing GWEX to enable it to capture the entire plume of contamination above action levels or to determine the location and pumping rate of additional extraction well(s) necessary to capture the entire plume of contamination above action levels (Tables 1 and 2).
6. Investigate potential uses for the treated water discharged from the ground water extraction and air stripping system.

SECTION X. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Alternatives were developed to respond to the ground water contamination at the Site. The alternatives described in the preceding section were evaluated using criteria related to factors mandated in Section 121 of CERCLA/SARA. Nine criteria were developed by EPA and are considered three major steps in the analysis of alternatives. The first step is to ensure that alternatives satisfy the threshold criteria. The two threshold

criteria are overall protection of public health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). Alternatives that do not satisfy these criteria should not be evaluated further. The second step is to compare protective and ARAR compliant alternatives against a set of balancing criteria. The five balancing criteria are long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, implementability, short-term effectiveness, and cost. The third and final step is to evaluate the alternatives on the basis of modifying criteria. The two modifying criteria are State and community acceptance.

1. Threshold Criteria

a. Protection of Human Health and the Environment

Alternatives 2 and 3 would both be protective of human health and the environment. They both reduce the risk of exposure to contaminated drinking water by containing the spread of the plume of contamination to the operating City wells, and they both reduce the toxicity and volume of contaminated ground water by removing contaminants from the ground water. The risks associated with the air emissions from the system have been evaluated using ambient air monitoring data. The results of the monitoring showed that as long as the air emission rate from the system does not exceed the performance criteria levels (Tables 1 and 2) no health concerns would be associated with the emissions. Risks associated with Site soils are low and the Site is fenced to prevent access.

Ambient air monitoring was done at the initial startup of the currently operating air stripping and vapor extraction system. This monitoring and modeling work, based on the data taken, indicated that the air emissions from the systems did not need further monitoring to protect human health. The current (March 1990) air emission rate is 0.0011 grams per second, which is less than 1/4 pound per day and less than 100 pounds per year which is less than the limit set by the State of Nebraska's Air Pollution Control Rules and Regulations emission rates of 100 pounds per day and 2.5 tons per year, respectively.

b. Compliance with ARARs

Alternatives 2 and 3 will meet the ARARs by reducing ground water contamination to meet State and Federal standards for drinking water and existing State and Federal air regulations. Alternatives 2 and 3 will also treat the extracted ground water so that it will meet The National Pollutant Discharge Elimination System's (NPDES's) discharge limits set for the Site.

2. Balancing Criteria

Alternatives 2 and 3 provide for the permanent removal of contaminants from the Site and containment of the plume of contamination. Both alternatives include ground water pump and treat and soil vapor extraction systems which are proven technologies and will achieve a reduction in mobility, toxicity and volume of contaminants in the soil and ground water at the Site. Alternative 3 (continued operation of the current response action systems) will require approximately 15 years to restore the aquifer to its beneficial use as a drinking water source. Alternative 2 (install an additional ground water extraction well) has the potential to shorten the time required for cleanup, and it is estimated that the time would be shortened to 10 years. However, additional data regarding the exact boundaries of the plume and the zone of influence of the existing ground water extraction well is required before any time saving provided by an additional well or the cleanup time for the existing well can be estimated accurately.

Alternatives 2 and 3 will require construction activities on or near the Site. Both alternatives will require monitoring well construction, and Alternative 2 may also require the construction of an extraction well. Contaminated materials may be encountered during well construction, but any release of volatile compounds will rapidly disperse and is not likely to pose a public health risk. Onsite workers may need protective equipment.

The ground water extraction and air stripping system, and vapor extraction system for Alternative 3 are already operating onsite, so the only capital cost would be for investigation and installation of monitoring wells. The operation and maintenance costs for Alternative 3 are approximately \$451,000 per year at present. Alternative 2 would require the installation of an additional ground water extraction well which would have an approximate capital cost of \$47,000 depending on size and location and would require adding \$13,000 to the approximate yearly operation and maintenance costs for Alternative 3.

The cost comparison for the alternatives would be as follows:

Alternative 2 (Additional Extraction Well)

TOTAL CAPITAL COSTS.....	\$ 167,000
TOTAL O&M COSTS PER YEAR.....	\$ 464,000
PRESENT WORTH (10 years, 10 percent)...	\$ 3,038,000

Alternative 3 (Continue Operating Current Systems)

TOTAL CAPITAL COSTS.....\$ 120,000

TOTAL O&M COSTS PER YEAR.....\$ 451,000

PRESENT WORTH (15 years, 10 percent)...\$ 3,550,000

Alternatives 2 and 3 have very similar costs and both are designed to be protective of health and the environment. Further investigation is required in order to determine the need for the additional extraction well in Alternative 2 and to estimate the time reduction it may provide.

3. Modifying Criteria

a. State Acceptance

The Nebraska Department of Environmental Control supported the Environmental Protection Agency's selection of the preferred alternative, Alternative 3, as presented in the Proposed Plan during the public meeting in Waverly on August 20, 1990.

b. Community Acceptance

The reservations, concerns, and supporting or opposing comments of the community on the Feasibility Study, the Proposed Plan, and other information in the Administrative Record were made known to the Environmental Protection Agency during the thirty-day public comment period and during the public meeting held on August 20, 1990. The public's comments are addressed in the Responsiveness Summary.

SECTION XI. THE SELECTED REMEDY

Based on available data and analysis conducted to date, the Environmental Protection Agency has selected the continued operation of the current expedited response action systems and the performance of the necessary investigations to verify their effectiveness (Alternative 3) as the remedy for the Waverly Ground Water Contamination Site. This alternative provides protection to human health and the environment from the threats associated with the Site and limits the migration of contaminants in and to the aquifer at the Site. This alternative also provides for compliance with applicable or relevant and appropriate laws and regulations.

The purpose of this response action is to prevent potential exposure to contaminated ground water, protect uncontaminated ground water for future use by preventing further migration of the contaminated ground water plume, and restore contaminated ground water for future use as a source of drinking water by

reducing the Site contaminants to their respective performance criteria levels (Tables 1 and 2). At the completion of the remediation, the level of Site contamination remaining in the ground water at or below the Applicable or Relevant and Appropriate Requirement levels will correspond to an excess lifetime cancer risk within the range of 10^{-6} to 10^{-4} through the exposure routes of direct contact and ingestion. For example, carbon tetrachloride in ground water in excess of five micrograms per liter will be remediated.

The installation of an additional ground water extraction well (Alternative 2) is not warranted at this time. The investigation necessary to design and site this additional well would be very similar to the investigation needed for Alternative 3. Based on the current Site data, the current systems are making progress toward Site cleanup.

The Environmental Protection Agency retains the authority to reassess the need for additional response actions at this Site as appropriate upon receipt of new information warranting a change.

SECTION XII. THE STATUTORY DETERMINATIONS

The Environmental Protection Agency's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this Site must comply with applicable or relevant and appropriate environmental laws unless a statutory waiver is justified. The selected remedy also must be cost effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

1. Protection of Human Health and the Environment.

The selected remedy protects human health and the environment through extraction and treatment of contaminated ground water and soil vapor. The contaminants will be permanently removed from the ground water by air stripping and from the soil through volatilization by active soil vapor extraction. The volatile gases will be transferred to the air stream for release to the atmosphere.

Extraction of the contaminated ground water will also eliminate the threat of exposure due to the spread of contamination to a larger area by checking the migration of the plume. Volatilization of contaminants from Site soils will eliminate the source of continued contamination of the ground water thus reducing the time needed for remediation. Risks associated with the ingestion of contaminated ground water from the Site are as high as 1.2×10^{-2} . The selected remedy, by extracting and treating the contaminated ground water, will reduce the risk below unacceptable levels. Ambient air monitoring and modeling have also been done on the stack emissions from the response action systems. This monitoring has shown that the systems, when operating within performance criteria (Tables 1 and 2), do not pose an unacceptable risk to the community. The combined emission rates from the response action systems have been well below the 0.147 grams per second performance limit since daily operations began in February 1988. There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

2. Compliance with Applicable or Relevant and Appropriate Requirements.

The selected remedy of ground water extraction and air stripping, and soil vapor extraction is designed to meet all applicable or relevant and appropriate requirements of Federal and more stringent State environmental laws. The requirements applicable to the Waverly Site are outlined in Section VII. The ground water extraction and air stripping system, and the soil vapor extraction system will continue to operate until the aquifer and the soil gas meet their respective remediation goals of 5 micrograms per liter and 6.5 micrograms per cubic meter as specified in the performance criteria for each system in Tables 1 and 2. The remedial action systems are designed so that air emissions and surface water discharge will meet their respective State and Federal discharge limits.

3. Cost-Effectiveness.

The selected remedy is cost-effective. It provides a high degree of protection to the current water supply wells in Waverly, and no capital expenditures are required for its implementation. The systems have already operated effectively for over two years and have removed contaminants from the soil and ground water at the Site. Ground water extraction and air stripping, and soil vapor extraction were chosen for implementation at the time of the expedited response action over a range of other technologies because of their implementability and cost effectiveness.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable.

The Environmental Protection Agency has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Waverly Ground Water Contamination Site. Of those alternatives that are protective of human health and the environment and comply with applicable standards, the Environmental Protection Agency has determined that this selected remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, also considering the statutory preference for treatment as a principal element and considering State and community input.

The selected remedy addresses the principal threat at the Site by reducing the toxicity, mobility, and volume of the contaminants in the ground water; complies with applicable or relevant and appropriate requirements; provides short-term effectiveness; and protects human health and the environment. The remedy is already in place and no additional capital costs are necessary for its implementation. The selected remedy is effective and already in place and is therefore determined to be the most appropriate solution for the contaminated ground waters at the Waverly Ground Water Contamination Site.

The State of Nebraska concurs with the selected remedy. Public comments were received concerning the potential use for the treated water from the system. Those comment are fully addressed in the Responsiveness Summary.

The Proposed Plan for the Waverly Site identified Alternative 3 as the preferred alternative for Site remediation. After a review of all written and verbal comments submitted during the public comment period, the Environmental Protection Agency has determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.

5. Preference for Treatment as a Principal element

The selected remedy uses air stripping technology for ground water treatment and active soil vapor extraction for source control and thus satisfies the statutory preference for remedies that employ treatment of the principal threat which permanently and significantly reduces the toxicity, mobility, or volume of hazardous substances as a principal element.

XIII. DOCUMENTATION OF SIGNIFICANT DIFFERENCES

No significant changes were made to the recommended alternative in the Proposed Plan.

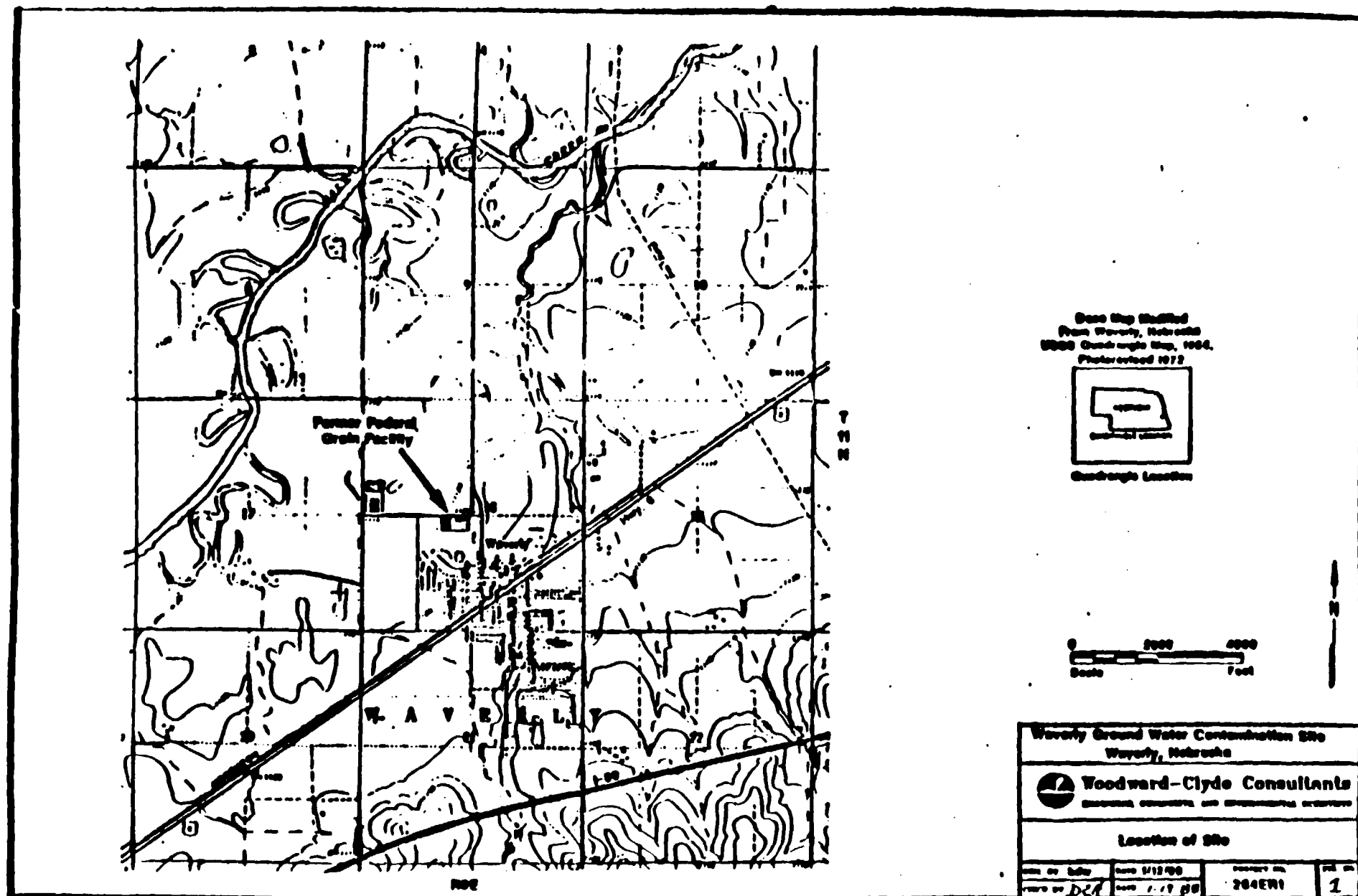


Figure 1

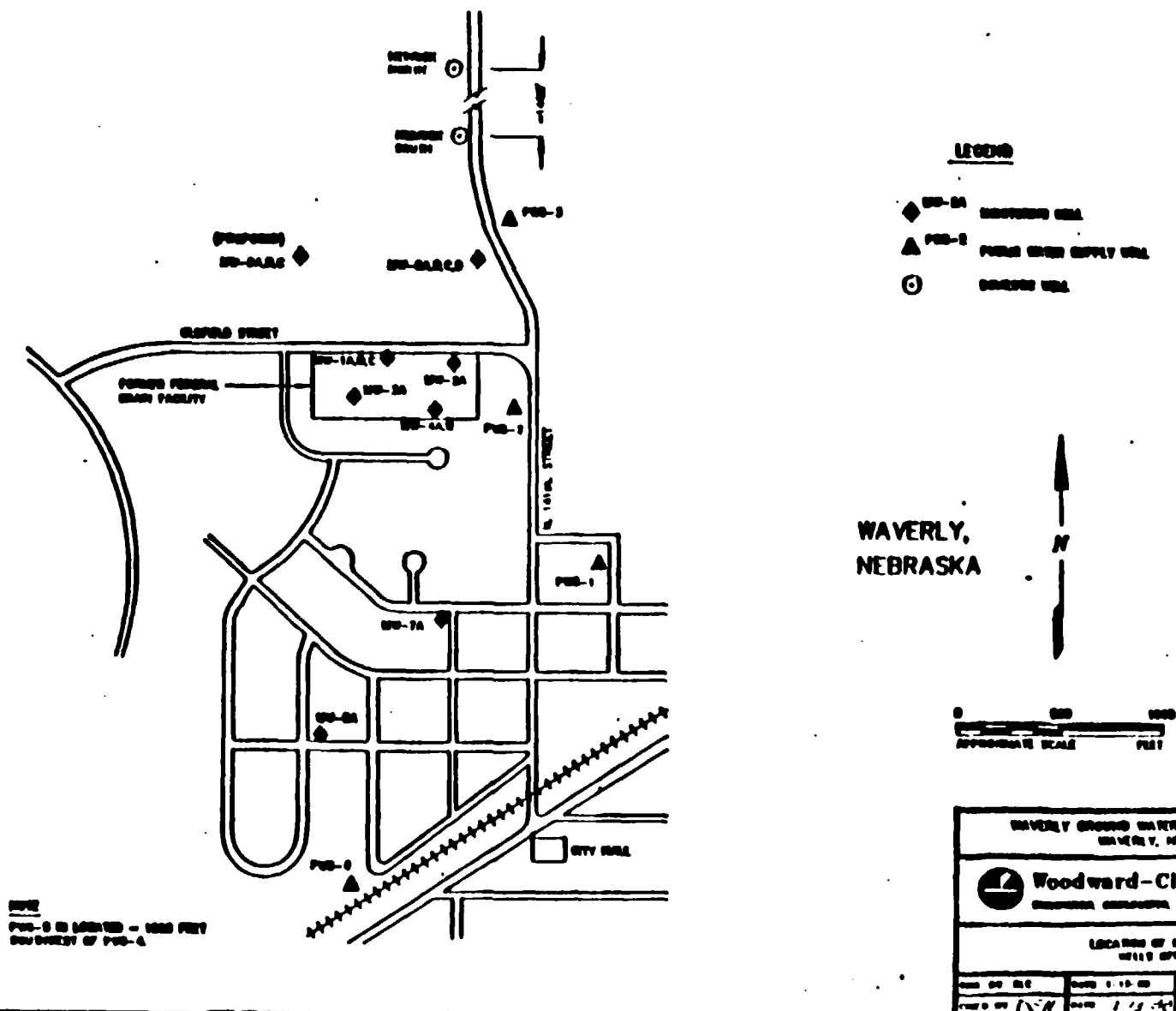


Figure 1 (continued)

TABLE 1
 PERFORMANCE CRITERIA

Media	Compliance Points	Action Levels			Monitoring Frequency		Compliance Period	
		CCl ₄	CHCl ₃	Radon	Initial Period ^(b)	Long Term		
Air	Combined VOC emissions from VES and Air Stripper System	-	0.147 g/s ^(a)	-	NA	Monthly for 1st Quarter	Quarterly	During all operations
	Ambient Air	-	1.25 ug/m ³ ^(a) above background	-	NA	Summer '00 ^(c)	As required	NA
Ground Water	All on-site monitoring wells (1-4)	5.0 ug/l	3.0 ug/l	NA	Monthly if above action level, other wells one time during 1st quarter	Quarterly if above action level, other wells annually	1 year (4 events after CWER wells are off)	
Surface Water	Air Stripping System discharge	6.95 ug/l	5 ug/l	NA	Monthly for 1st quarter	Monthly	During all operations	

- NOTES:
 (a) Action level is total of CCl₄ and CHCl₃ values.
 (b) Initial period begins April 1, 1988.
 (c) Seasonal ambient air monitoring will be discussed with USEPA after the May 1988 VOC emission monitoring period.
 (d) Air stripper system discharges shall be maintained between 6 and 9 pH units.
 (e) Initial soil samples indicated that soils comply with action level and no additional sampling is anticipated.
 (f) Individual VES wells are to be isolated from VES system when concentrations are below action level.
 NA Not applicable.

TABLE 2

PERFORMANCE CRITERIA

Media	Compliance Points	Action Levels			Monitoring Frequency		Compliance Period
		CCI ₁	CCI ₂	Reason	Initial Period (b)	Long Term	
Soil	Former Federal Grain Facility	1.1 mg/kg	1.7 mg/kg	NA	NA (e)	NA (e)	NA (e)
Soil Gas	SGMW-5 (A, B, & C) and all VES wells	-	6.5 ug/m ³	-	NA	Monthly if above action level, otherwise one time during 1st quarter	Quarterly if above action level, otherwise annually
							1 year (4 events) (f)

- NOTES:
- (a) Action level is total of CCI₁ and CCI₂ values.
 - (b) Initial period begins April 1, 1988.
 - (c) Seasonal ambient air monitoring will be discussed with USEPA after the May 1988 VOC emission monitoring period.
 - (d) Air stripper system discharges shall be maintained between 6 and 9 pH units.
 - (e) Initial soil samples indicated that soils comply with action level and no additional sampling is anticipated.
 - (f) Individual VES wells are to be isolated from VES system when concentrations are below action level.
- NA Not applicable.

**RECORD OF DECISION
RESPONSIVENESS SUMMARY
WAVERLY GROUND WATER CONTAMINATION SITE
WAVERLY, NEBRASKA**

**Prepared By:
THE ENVIRONMENTAL PROTECTION AGENCY
REGION VII
KANSAS CITY, KANSAS
September 1990**

WAVERLY GROUND WATER CONTAMINATION SITE RESPONSIVENESS SUMMARY

A. OVERVIEW

In the Proposed Plan released to the public, the Environmental Protection Agency presented a preferred alternative for the cleanup of the Site. The recommended alternative was to continue the operation of the current response action systems which address the remediation of contaminated ground water and contaminated soil. The preferred alternative involved the extraction and air stripping of contaminated ground water to remove contaminants from the aquifer and contain the spread of the contaminant plume, and the extraction of soil vapor to control the source of contamination.

Based on the comments received during the public comment period, there is general support for the preferred alternative. The major comments received addressed the need to find alternate uses for the treated water currently discharged from the system to a nearby creek and the effect of the ground water extraction well on the availability of water in the Waverly aquifer for agricultural uses. Other comments received related to the operation, cost, and effectiveness of the treatment systems.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Site dates back to 1982 when contamination of the public water supply wells in Waverly was first discovered. The major issues expressed at that time were concerned with providing the community with a safe drinking water supply. The community was also involved during the summer of 1987 when the decision was made to install the current response action systems at the Site. A public meeting was held in August 1987 with the Mayor and City Council to present the planned response actions and to solicit comments on the plan. A door-to-door survey of the residences near the Site was conducted to solicit public concerns associated with the response actions planned.

The public comment period on the preferred alternative as outlined in the Proposed Plan began on August 9, 1990 and ended September 7, 1990. A public meeting was held in Waverly on August 20, 1990. The responsiveness summary addresses comments received during this period.

C. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

Comments received during the public comment period on the Feasibility Study and Proposed Plan for the Waverly Ground Water Contamination Site are briefly summarized below. The comments are categorized by topics.

Remedial Alternative Preferences

1. EPA's preferred plan is to continue the operation of the present ground water pump and treat and soil vapor extraction systems with additional investigation to evaluate the effectiveness of the method. The process could take as long as 30 years. The commentor's questions were in the following three general areas:
 - a) Are there other possible ways to remove the contaminants?
 - b) If so, how seriously have these alternatives been considered?
 - c) What are the reasons that other alternatives were not seriously considered?

EPA Response

It is difficult to estimate the exact duration of a ground water cleanup such as the one taking place at Waverly. Based on the average yearly decline in the concentration of carbon tetrachloride in the ground water extracted from the Waverly aquifer, an estimate of 15 years to achieve the action level concentration of 5 parts per billion in the extracted water could be made. The thirty year duration for the cleanup of the Site suggested in this comment is not an EPA estimate.

The Engineering Evaluation Cost Analysis (EE/CA) for the Expedited Response Action at the Waverly Ground Water Contamination Site completed May 16, 1986 (Revised March 27, 1987) compared several alternatives to protect public health and the environment from site related hazards. The alternatives considered for insitu soil treatment were active soil gas extraction, biological treatment, chemical treatment, and photolysis. The alternatives considered for ground water treatment were pump and discharge, air stripping, activated carbon treatment, and biological treatment. Excavation of Site soils and offsite disposal, and Site encapsulation were also considered as alternatives. Based on the criteria of technical reliability, feasibility, and applicability; protection of public health, safety, and the environment; and cost effectiveness; the combination of soil vapor extraction for source control and air stripping and surface discharge for ground water treatment and plume control were selected as the best options for the Waverly Site.

2. Alternative 2 is the installation of an additional extraction well at the Site. Why not move to install the additional well now and accelerate the cleanup process?

EPA Response

The performance monitoring carried out during the more than two years of operation of the current systems has shown that the contaminant plume is being drawn back. Additional ground water monitoring points are needed to verify the effectiveness demonstrated by the systems in all directions. Additional data will also be needed to determine the effectiveness of an additional extraction well. Once the effectiveness of the current systems has been fully evaluated, the need for additional ground water extraction capacity can be determined.

Technical Questions/Concerns Regarding Remedial Alternatives

1. What has been done and what can be done to use the treated water discharged for the systems at Waverly?

EPA Response

The current ground water extraction well withdraws about 100 gallons of water per minute for the shallow portion of the Waverly aquifer. The only possible use for the discharge water evaluated at the time the current systems were installed was to carbon polish the water and provide it to the City water supply. The option chosen was surface discharge to a nearby creek. Potential alternatives for the reuse or recycling of the treated water from the system will be investigated as part of the further investigation of the effectiveness of the systems.

2. Concern was expressed as to the depletion of the ground water aquifer in the Waverly area by the continued "pump, treat, and discharge process" for an extended, indefinite period. A question was raised as to whether EPA has conducted an impact analysis of this continuous pumping on the local aquifer. Similar concern was expressed as to the impact of pumping Waverly's Public Water Supply Well Numbers 6 and 7 located southwest of Waverly on the availability of water for agricultural and other uses.

EPA Response

The ground water extraction well withdraws only about 100 gallons per minute from the aquifer. During the design of the pump and treat system, data from the State of Nebraska Conservation and Survey Division observation well, approximately one mile west of Waverly, indicated that the aquifer

was underutilized having risen over five feet since 1970. Further investigation into the impact of continued pumping of the ground water extraction well on the availability of ground water for agricultural and other uses will be addressed.

The location or impact of the City of Waverly's wells on the stability of the water supply in the region has not been evaluated as part of the remedial action.

3. Are private water supplies being adversely affected by the contamination at the Site? What steps are being taken to compensate people if their wells are contaminated? Are measures being taken to remove contamination from their water supply?

EPA Response

Samples taken from one private drinking water well in the area of the Site have shown concentrations of Site related contaminants above acceptable levels. This household is being provided bottled water for consumption. The extension of the public water system to include this residence was investigated, but an agreement with the City of Waverly on the terms and scope of the water main extension could not be reached. The installation of a carbon filtration system was also investigated but the well and distribution system for the home could not support the system. The installation of a new household well is now under investigation.

4. One residential well located north of the Site has continued to show contamination during the more than two years of operation of the remedial action systems. What assurances do we have that a portion of the plume has not been released and will not continue to spread contamination toward Salt Creek? What can be done if the plume is not being captured by the current systems?

EPA Response

The additional investigation proposed as part of the continued response action will address these concerns. The residential well referred to in the question is a hand dug well in the basement of the residence. The reliability of the well as a monitoring point is questionable. The investigation of the effectiveness of the remedy will include the development of monitoring wells in the areas where questions remain as to whether the entire plume has been captured.

Should data indicate that the current remedial action systems are not progressing toward cleanup of the Site, additional remedial action may be required.

5. How is the treatment of contaminated soil at the Site being addressed?

EPA Response

The soil contamination at the Site does not present an unacceptable risk to human health and, therefore, does not require remediation. However, the contaminants in the soil provide a source of contamination for the ground water at the Site. The soil vapor extraction system was designed to remove this source of contamination, and no further remedial action is planned for the Site soils once the action levels have been reached in the soil gas.

6. Is the cleanup rate at the Waverly Site satisfactory? How does it compare to other ground water cleanups?

EPA Response

The remedial action systems at Waverly have made good progress toward the eventual cleanup of the Site. The concentration of contaminants in the ground water extracted from the aquifer has declined from a concentration near 3,000 parts per billion carbon tetrachloride to a concentration near 200 parts per billion in the two years since the systems went into operation.

It is difficult to compare cleanup actions at different sites due to the vast difference in site conditions that usually exist. The Waverly systems would compare favorably with most other similar cleanup actions.

Public Participation Process

1. One individual at the public meeting on August 20, 1990 requested that another public meeting be held since all of his statements had not gotten into the record.

EPA Response

This individual statements were recorded during the public meeting on August 20, 1990 and this individual was asked to provide further comments in writing. EPA received written comments from this individual on September 11, 1990.

Cost/Funding Issues

1. What is the total cost of the project?

EPA Response

The cost estimate for the continued operation of the remedial action systems for a 15 year period was estimated at \$3,550,000. The cost to date for the entire project is approximately \$4,000,000. The total estimated cost of the project would thus be approximately \$7,550,000.

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